Retrofit Windows Guide

The Retrofit Windows Guide will be produced by Pacific Northwest National Laboratory (Marye Hefty, Project Lead)

The purpose of our retrofit windows guide is

- to communicate the absolute do’s and don'ts when retrofitting windows (from a whole-house and building science approach).
- to communicate to contractors and interested homeowners that all retrofits need to be completed by skilled people who understand whole-house building science (because of the potential problems, health, and safety issues with any energy upgrade) and
- to communicate DOE’s Building America research and results in a forum/style that is accessible to the builder/contractor
Why Retrofit Windows?

Improve energy efficiency of your home

Improve comfort of your home

As part of renewal (damage) and up-dating (aesthetics) of your home.
New Construction

Basic Path:
- Select the right fenestration product for the task – including considerations such as exposure /climate / attachment…
- Prepare the rough opening to ensure the product will properly fit
- Integrate the rough opening with the water resistive barrier (WRB), which provides air / water protection to the building envelope
- Install the fenestration product into the rough opening, ensuring proper functioning (plumb / level / square & ensure proper operation)
- Ensure complete integration between the fenestration product and building envelope (WRB) through correct lapping and sequencing of flashing & sealant materials
Window Retrofit Variables

Other retrofit items
- Air sealing
- HVAC replacement
- Ventilation

Air & water management
- Water-resistive barrier
- Flashing
- Air barrier
- Sealants
- Existing
- New

Windows
- Retrofit in place
- Replace sash
- Replace full window
- Double hung, awning, etc.
- Flange or non-flange

Cladding
- Over-clad
- Replace
- Leave in place

Damage & special
- Asbestos siding
- Lead paint
- Moisture damage
- Non-square openings

Climate
- Precipitation level
- Climate zone

Cladding type
- Stucco
- EIFS
- Brick
- Wood siding
- Fiber cement
- Vinyl siding

Sealants
- Air barrier
- Flashing barrier
- Water resistive

Condensation
- Water intrusion

Addage exterior R-value

Window shape
- Addge exterior R-value

Window retrofit plan
Window Retrofit: General Considerations

It is advisable to follow a process that will define and plan the individual retrofit project.

- Choose product and materials that are suitable for your home and your climate.
- Understand the retrofit scope
- Correct any damage and/or defects in the existing construction.
- Establish continuity of the air, water and thermal management with the wall system to extent possible considering the retrofit scope.
- Understand the effect of changing the window on other systems
Window Choice Resources

US Department of Energy
- Selecting new energy-efficient windows, 
  http://www.energysavers.gov/your_home/windows_doors_skylights/index.cfm/mytopic=13340
- Guide to Energy Efficient Windows, 
  http://www.energysavers.gov/pdfs/guide_to_energy_efficient_windows.pdf

Efficient Windows Collaborative
- http://www.efficientwindows.org/

EPA
  http://www.epa.gov/oaintrnt/documents/ae_addendum1_508.pdf 36)
- Energy Star – Climate Zones Website: 
  http://www.energystar.gov/index.cfm?c=windows_doors.pr_crit_windows

FSEC
- Q&A Residential Window Replacement, 
  Provides advice to homeowners on selecting window replacements

NAHB

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## Retrofit Scenarios

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| Replace sash only | Water management is not changed by retrofit  
Repair any damage to window frame.  
Air and water seal interior of window frame to the degree possible |
|-------------------|---------------------------------------------------------------------|
| Replace window, water-resistive barrier intact and accessible | Air and water seal the rough opening. A liquid applied flashing material that meets AAMA 714-11 is recommended.  
Integrate flashings with existing water-resistive barrier.  
Install an interior air/water seal through the use of backer rod and sealant or low expansion foam around the entire interior perimeter of the window |
| Replace window, no water-resistive barrier intact or water-resistive barrier inaccessible | Air and water seal the rough opening. A liquid applied flashing material that meets AAMA 714-11 is recommended.  
Install sill flashing to a ‘through cavity’ flashing component that is sloped to the exterior and directed over the cavity between the frame and the exterior cladding. The drainage component of the flashing is directed to the exterior of the cladding.  
Install an interior air/water seal through the use of backer rod and sealant or low expansion foam around the entire interior perimeter of the window |
Window Retrofit Guide is a work in progress.

Thank you for listening.